

PICKET CORRAL HOMEOWNERS (PWS 3230027) SOURCE WATER ASSESSMENT REPORT

September 13, 2000



State of Idaho Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for Picket Corral Homeowners, Gem County, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Picket Corral Homeowners drinking water system consists of one well. Due to a moderate rating in hydrologic sensitivity and moderate rating for system construction, and no potential contaminant sources, the well was rated as having a moderate susceptibility to inorganic contamination, volatile organic contamination, and synthetic organic contamination. Total coliform bacteria were detected at the Fast Utility Sink in March 2000 and December 1999, and at various locations in late 1993. No other categories of contamination have been recorded in the well water above the Maximum Contaminant Levels.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the Picket Corral Homeowners, source water protection activities should focus on wellhead protection activities such as conducting a new sanitary survey. Disinfection practices should be considered to reduce the risk of microbial contamination. Possible sources of nitrate contamination like agricultural and ranching land uses should implement practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas.

Most of the designated areas are outside the direct jurisdiction of the Picket Corral Homeowners. Partnerships with state and local agencies and industry groups should be established and are critical to success. Due to the time involved with the movement of groundwater, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission and Gem Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR PICKET CORRAL HOMEOWNERS, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is attached.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (IDEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. IDEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Picket Corral Homeowners community well serves approximately 32 people with 13 total connections. The well is located in Spring Gulch in Gem County, to the northeast of the City of Emmett and to the southeast of Black Canyon Dam (Figure 1). The public drinking water system for Picket Corral Homeowners is comprised of one well.

Total coliform bacteria were detected at the Fast Utility Sink in March 2000 and December 1999, and at various locations in late 1993. No inorganic contaminant (IOC) (i.e. nitrate) has been recorded above the Maximum Contaminant Level (MCL). Volatile organic contaminants (VOCs) and synthetic organic contaminants (SOCs) have never been detected in any of the drinking water. Though no significant water chemistry problems currently exist, the possibility of contamination from agricultural and ranching land uses remains.

Defining the Zones of Contribution--Delineation

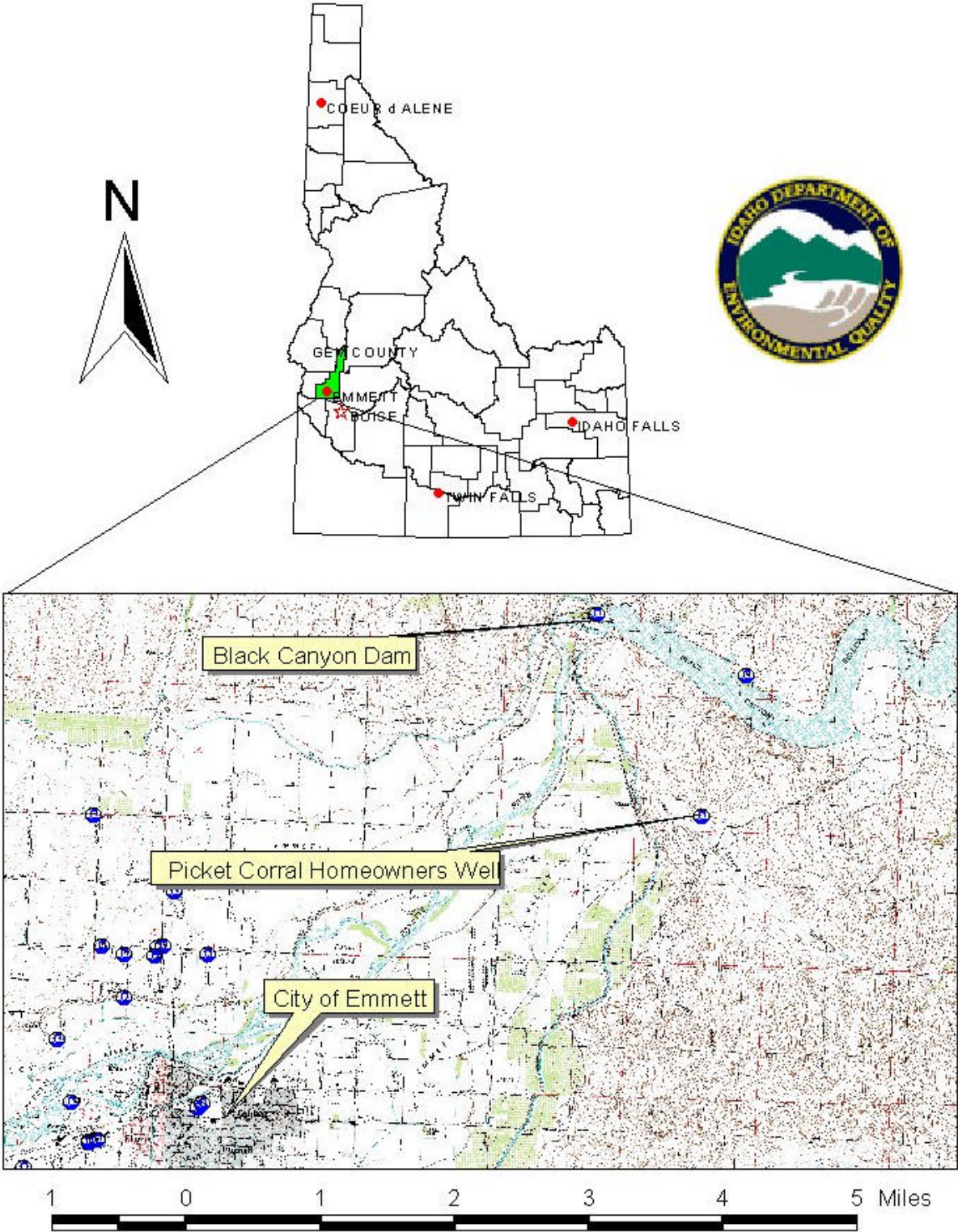
The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. IDEQ used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) time of travel for water associated with the Payette Valley aquifer in the vicinity of Picket Corral Homeowners. The computer model used site specific data, assimilated by IDEQ from a variety of sources including the Picket Corral Homeowners well log and other local area well logs. The delineated source water assessment areas for Picket Corral Homeowners well can best be described as a corridor approximately ½ mile wide and 2 ½ miles long extending southeast to the watershed boundary of the Spring Gulch (Figure 2). The actual data used by IDEQ in determining the source water assessment delineation areas are available upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by IDEQ and from available databases.

The dominant land use outside the Picket Corral Homeowners area is rangeland. Land use within the immediate area of the wellhead consists of residential uses.

Figure 1. Geographic Location of Picket Corral Homeowners Well



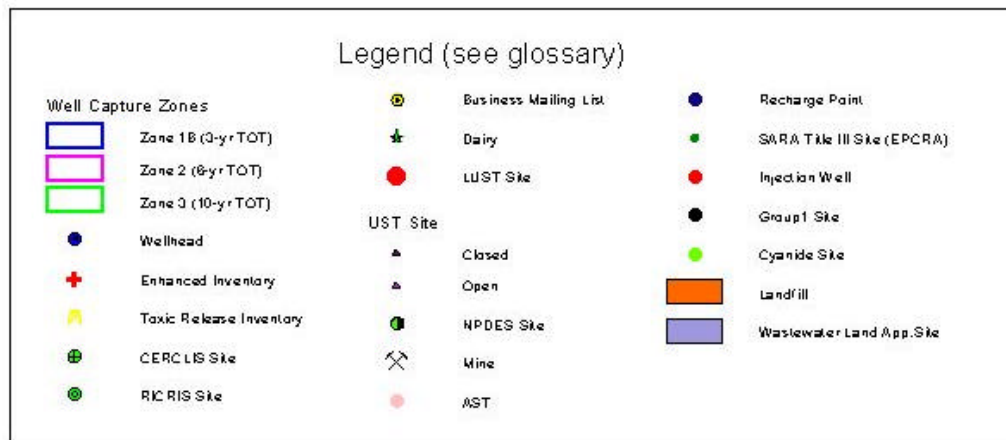
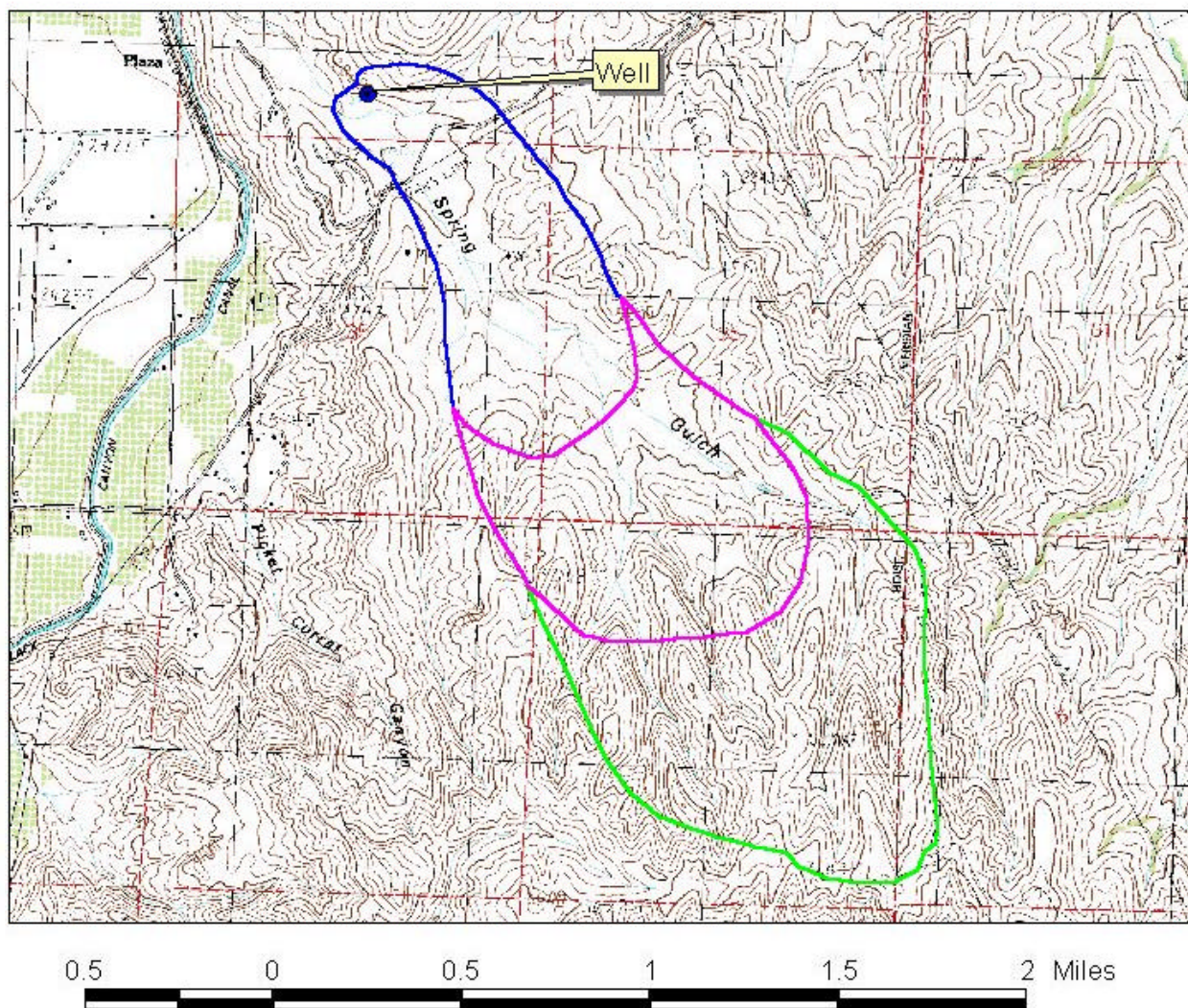
It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination. These involve educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted during the summer of 2000. The first phase involved identifying and documenting potential contaminant sources within the Picket Corral Homeowners Source Water Assessment Area through the use of computer databases and Geographic Information System (GIS) maps developed by IDEQ. The second or enhanced phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. This task was undertaken with the assistance of Dale Babbitt.

No potential contaminant sites, other than land uses, are located within the delineated source water area (Figure 2). Contaminants of concern are nitrate and bacteria, which have been detected in the well water.

**Figure 2. Picket Corral Homeowners Well
Delineation and Potential Contaminant Locations**



Section 3. Susceptibility Analysis

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

Hydrologic sensitivity was rated moderate for the well (see Table 1). This reflects the nature of the soils being in the poorly-drained to moderately-drained class, and the vadose zone (zone from land surface to the water table) being made predominantly of sandy clay, both factors that reduce the flow of contaminants downward. Factors that could increase the movement of contaminants include the depth to groundwater, which is 15 feet in this case, and the lack of a low permeability unit of at least 50 feet cumulative thickness.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. The Picket Corral Homeowners drinking water system consists of one well that extracts groundwater for domestic uses. The well system construction score was moderate for the well.

A sanitary survey conducted in November 1980 showed that no well house was protecting the wellhead from flooding. A determination could not be made as to whether the wellhead and surface seal were being maintained. The well log shows that the casing and annular seal do extend into a low permeability unit. The well was drilled to 150 feet below ground surface (bgs). The water table was identified at 15.5 feet bgs. A well screen was installed from 52 feet bgs to 147 feet bgs. A surface seal was installed to a depth of 32 feet bgs into a cemented sand, gravel, and clay layer. Blue clay was identified at 53 feet bgs. The well is likely drawing from the deeper, confined aquifer below the blue clay layer.

Though the well may have been in compliance with standards when it was drilled in 1978, current PWS well construction standards are more stringent. The Idaho Department of Water Resources Well Construction Standards Rules (1993) require all public water systems (PWSs) to follow IDEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the Recommended Standards for Water Works (1997) during construction. Current standards require that 10-inch diameter steel casing have a thickness of 0.365 inches. The Picket Corral Homeowners well uses 0.250-inch thick casing.

Potential Contaminant Source and Land Use

The well rates low for inorganic chemicals (IOCs) (ex. nitrate), synthetic organic chemicals (SOCs) (ex. pesticides), volatile organic chemicals (VOCs) (ex. petroleum products), and microbial contaminants. With no potential sources and local land use not being agricultural in nature, no points were given in this section of the analysis.

Final Susceptibility Ranking

A detection above a drinking water standard Maximum Contaminant Level (MCL) or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Total coliform bacteria were detected at the Fast Utility Sink in March 2000 and December 1999, and at various locations in late 1993. Nitrate levels have been recorded at 2 to 3 mg/L in the past years (MCL=10 mg/L). No VOCs or SOC's have ever been recorded in the well water.

Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. If there had been multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and much agricultural land, they would contribute greatly to the overall ranking as well. In terms of total susceptibility, the Picket Corral well rates moderate for IOC's, VOC's, and SOC's. The well was given an automatic high rating for microbial contamination because of the recent detections.

Table 1. Summary of Picket Corral Homeowners Susceptibility Evaluation

Well	Susceptibility Scores									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	M	L	L	L	L	M	M	M	M	H*

H = High Susceptibility, M = Moderate Susceptibility, Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

H* - Indicates source automatically scored as high susceptibility due to presence total coliform bacteria in the tested well water.

Susceptibility Summary

Water chemistry data show that microbial contamination currently threatens the Picket Corral Homeowners drinking water system. Though nitrate is detected in the well water, the level is not near the MCL for nitrate. No other type of contamination current threatens the well.

The well in the Picket Corral Homeowners system takes its water from the deeper, confined to semi-confined lacustrine (lakebed deposited) aquifer. The well seems sufficiently sealed from cross contamination with the shallow, unconfined alluvial (river deposited material) aquifer. The shallow aquifer has been demonstrated to be a distinct water-bearing unit in terms of water quality, water yield, and the sources of recharge (IDEQ, 2000). The shallow aquifer contains much higher levels of nitrate, lower levels of iron, and higher levels of arsenic than the deeper aquifer. Future increases in nitrate could be indicative of cross contamination with the upper aquifer. Water yields from the shallow aquifer are significantly higher than from the deeper aquifer. Groundwater in the shallow aquifer is recharged primarily from surface water infiltration and direct precipitation, while the sources of recharge to the deeper aquifer are indeterminate but are likely older.

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the Picket Corral Homeowners, source water protection activities should focus on wellhead protection activities such as conducting a new sanitary survey. Disinfection practices should be considered to reduce the risk of microbial contamination. Possible sources of nitrate contamination like agricultural and ranching land uses should implement practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas.

Most of the designated areas are outside the direct jurisdiction of the Picket Corral Homeowners. Partnerships with state and local agencies and industry groups should be established and are critical to success. Continued vigilance in keeping the well protected from surface flooding can also keep the potential for contamination reduced. Due to the time involved with the movement of groundwater, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho Department of Agriculture, the Soil Conservation Commission and Gem Soil and Water Conservation District, and the Natural Resources Conservation Service.

Assistance

Public water supplies and others may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Boise Regional IDEQ Office (208) 373-0550

State IDEQ Office (208) 373-0502

Website: <http://www2.state.id.us/deq>

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at (208) 743-6142 for assistance with wellhead protection strategies.

POTENTIAL CONTAMINANT INVENTORY

LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund, is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (IDEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by IDEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

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Idaho Division of Environmental Quality, 1994. Ground Water and Soils Reconnaissance of the Lower Payette Area, Payette County, Idaho. Ground Water Quality Technical Report No. 5. Idaho Division of Environmental Quality. December 1994.

Idaho Division of Environmental Quality, 1996. Lower Payette River Agriculture Irrigation Water Return Study and Ground Water Evaluation, Payette County, Idaho. Water Quality Status Report No. 115.

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Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Natural Resource Conservation Service, 1991. Idaho Snake-Payette Rivers Hydrologic Unit Plan of Work. March 1991.

United States Geological Survey, 1986. Quality of Ground Water in the Payette River Basin, Idaho. United States Geological Survey. Water Resources Investigation Report 86-4013.

University of Idaho. 1986. Ground Water Resources in a Portion of Payette County, Idaho. Idaho Water Resources Research Institute. University of Idaho. Moscow, Idaho. April 1986.

Attachment A

Picket Corral Homeowners Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- ≥ 13 High Susceptibility

Ground Water Susceptibility Report

Public Water System Name :

PICKETT CORRAL HOMEOWNERS

Well# : WELL #1

Public Water System Number 3230027

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1. System Construction

SCORE

Drill Date	10/16/1978	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	1980
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	NO	1
Casing and annular seal extend to low permeability unit	YES	0
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	NO	1

Total System Construction Score 4

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	YES	0
Vadose zone composed of gravel, fractured rock or unknown	NO	0
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2

Total Hydrologic Score 3

3. Potential Contaminant / Land Use - ZONE 1A

IOC Score	VOC Score	SOC Score	Microbial Score
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Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	NO	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	0	0

Potential Contaminant / Land Use - ZONE 1B

Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0

Total Potential Contaminant Source / Land Use Score - Zone 1B 0 0 0 0

Potential Contaminant / Land Use - ZONE II

Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	

Potential Contaminant Source / Land Use Score - Zone II 0 0 0 0

Potential Contaminant / Land Use - ZONE III

Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	

Total Potential Contaminant Source / Land Use Score - Zone III	0	0	0	0
Cumulative Potential Contaminant / Land Use Score	0	0	0	0
4. Final Susceptibility Source Score	7	7	7	7
5. Final Well Ranking	Moderate	Moderate	Moderate	Moderate